

WHAT IS CLAIMED IS:

1. A radiation spectrum analyzer comprising:
  - at least one source providing radiation having at least one selected spectral component, said spectral component having an intensity, a center wavelength and a bandwidth;
  - first optics collecting, dispersing and focusing said radiation to form an image dispersed by wavelength along a dispersion axis onto a plane;
  - a two dimensional spatial radiation modulator rotated about a rotation axis and positioned in said plane so that said dispersion axis is substantially along a radial axis, said modulator having at least one radiation filter at a radius from said rotation axis, said filter having a radial width substantially defining the bandwidth of a corresponding spectral component of said radiation, said filter modulating the intensity of said corresponding spectral component substantially independent of said bandwidth to provide an encoded beam comprising at least one encoded component, wherein the amplitude of said encoded component changes between three or more substantially distinct levels of contrast as said modulator is rotated about said rotation axis;
  - a detector;
  - second optics collecting and directing said encoded beam onto said detector, causing the detector to provide an output; and
  - computer analyzing signals generated by said detector in response to said encoded beam.
2. A two dimensional spatial radiation modulator adapted to be rotated about a rotation axis to modulate at least one component of an incident radiation beam to encode said beam, said modulator comprising a substrate and at least one radiation filter located at a radius from said rotation axis, said filter comprising an annular region substantially encompassing a plurality of pixels having optical characteristics substantially different from said substrate, said pixels being patterned substantially within said annular region to modulate the intensity of a corresponding component substantially only along an azimuthal axis to provide an encoded component, wherein the amplitude of said encoded component changes between three or more substantially distinct levels of contrast as the substrate is rotated about said rotation axis.

3. A method for analyzing a radiation spectrum, comprising:
- providing radiation having at least one selected spectral component, said component having an intensity, a center wavelength and bandwidth;
- 5 collecting, dispersing and focusing said radiation to form an image dispersed by wavelength along a dispersion axis onto a plane;
- positioning a two dimensional spatial radiation modulator in said plane and rotating said modulator about a rotation axis so that said dispersion axis is substantially along a radial axis, said modulator having at least one radiation filter at a radius from said
- 10 rotation axis, said filter having a radial width substantially defining the bandwidth of a corresponding spectral component of said radiation, said filter modulating the intensity of said corresponding spectral component substantially independent of said bandwidth to provide an encoded beam comprising at least one encoded component, wherein the amplitude of said encoded component changes between three or more substantially
- 15 distinct levels of contrast as said modulator is rotated about said rotation axis;
- collecting and directing said encoded beam onto a detector; and
- analyzing signals generated by said detector in response to said encoded beam.

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